Population, Energy & Resources: Take Home Exam #1

Due in class on Thursday, February 2

This exam consists of three questions pulled from material from the first three weeks of class. The exam's purpose is for you to demonstrate that you understand the concepts by using them in a new context, or by supplying new examples that force you to investigate the concepts more deeply. In answering the questions, you should use your own words, and take your arguments beyond the material from lecture and texts.

Each question should be answerable in 500 words or less; your entire exam should not exceed 2,000 words. Shorter is even better: concision forces precision of thought. That said, your answers should include as many pieces of evidence as you can find, rather than as few as possible.

Feel free to discuss this exam with other students in the class until you begin actually writing your answers. At the point that you have begun writing, do not discuss your answers with other students, but you may, and should, use other sources.

Number your pages. Double-space the text. If you cite anything outside of class readings, give the full bibliographic citation. If using a reading from class, citation of the (lead) author is sufficient.

1. What parameters increase the likelihood that an introduced species will turn into an invasive species? Identify at least five distinct factors, and supply specific examples that were not discussed in class to support these.

2. Define each of the following concepts, and for each, identify a particular issue in modern human health that can be better understood by applying the concept, using the basic premises of evolutionary medicine. Be as specific as possible, and use examples other than those from lecture. You may want to refer to one or more of the changes that have occurred in the last 5 mya in how humans interact with and use their environment.

a) Adaptive landscape
b) Red Queen
c) Historical constraint

Of the three examples that you provide, which one seems the most intractable (that is, the most difficult to cure or resolve), and why?

3. Smil documents an ongoing transition from "traditional" to "fossil fuel" civilization. In readings and lecture we have explored some of the potential limits to this new phase in human development. Compare the transition from fossil fuels to the transition to them. What are some of the similarities and differences? Be as precise and specific as you can, making reference to the ideas and information we have been considering. You may want to take into account the social and biophysical causes of these transitions, the mechanisms through which they occur, their consequences for human beings and their relationship to natural processes. Do not feel as though you have to say everything; a few well-established points will be sufficient.